

## CITY OF RIVERSIDE

09/16/2005

Revised

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## HUMAN RESOURCES DEPARTMENT

## CLASSIFICATION SPECIFICATION

**TITLE: ENGINEERING AIDE/TECHNICIAN SERIES**

**Engineering Aide  
Senior Engineering Aide  
Engineering Technician**

**Senior Engineering Technician (Civil)  
Utilities Senior Engineering Technician (Electric)**

**DEFINITION**

To perform para-professional office and field engineering work. Depending upon level and assignment, work includes drafting; field; survey; project design, calculations, and layout; contract administration; inspection; engineering related computer aided technology and applications; and related duties as required.

**DISTINGUISHING CHARACTERISTICS**

The Engineering Aide/Technician Series encompasses four distinct levels of work. Positions within this series will be allocated based upon the level of work required to be performed by the department to which it is assigned. Promotion within the series shall not be automatic. Should the department require an incumbent to perform work at a higher level within the series, an incumbent may be advanced to the next level upon attaining the necessary knowledge and skills, having met the necessary minimum qualifications of the higher level, and having demonstrated the ability to successfully perform the duties of the higher level.

Note: Department Head may waive, with the Human Resources Director's concurrence, the experience/educational requirements if the incumbent demonstrates proficiency and performance at a higher level.

Engineering Aide: This is the entry level in which incumbents perform predefined, routine work that does not require previous specialized experience. Work assignments are technical tasks that are limited in scope and support technical and project management functions.

Senior Engineering Aide: This is the journey level in which incumbents perform moderately complex work requiring further para-professional engineering work experience and formal training. Work assignments involve full responsibility for routine projects that are limited in scope and increasing responsibility for a variety of moderately complex projects involving independent investigation and study, responsibility for completion of work orders, and responsibility for resolving field problems.

Engineering Technician: This is the advanced journey level in which incumbents perform complex work requiring increasingly responsible para-professional engineering work experience and further formal training. Work assignments involve full responsibility for a variety of complex projects, which are broad in scope and involve multiple considerations. Work assignments involve further independent investigation, study, and resolution. Incumbents have full responsibility for completion of multiple work orders, and responsibility for resolving more complex field problems.

Senior Engineering Technician: This is the advanced/lead level in which incumbents perform complex work requiring substantial para-professional engineering work experience and further formal training. Work assignments involve full responsibility for projects of the greatest size and highest levels of complexity. Assignments involve multiple considerations and the use of technical knowledge and skill in the investigation, study, and resolution of various project related issues. Incumbents have full responsibility for completion of multiple work orders, and responsibility for resolving the most complex field problems.

**REPORTS TO:** Varies

## **SUPERVISION RECEIVED AND EXERCISED**

Engineering Aide: Receives close supervision. Work is performed in accordance with well-established guidelines or procedures. Assignments are given with explicit instructions and are routine such that few deviations from established practices are made without checking with the supervisor. No supervision is exercised over others.

Senior Engineering Aide: Receives general supervision. Assignments are given with less specific instructions. Judgment is necessary in selecting appropriate established guidelines to follow. Interpretation and application of appropriate procedures is sometime necessary. Significant deviations from well-defined practices require prior approval from the supervisor. May exercise technical supervision in which well-established guidelines or procedures (e.g. methods, materials, and formats) are specified to others in work assignments. May assist in the training and evaluation of staff, as assigned.

Engineering Technician: Receives direction. Duties are assigned with general instructions. Judgment is normally required to implement the appropriate procedures. Discretion is required in the selection of appropriate resources to use in accomplishing assigned work. Work frequently requires interpretation of policies and guidelines and regularly requires development of recommendations consistent with given directives, policies, and regulations. May exercise technical supervision in which well-established guidelines or procedures (e.g. methods, materials, and formats) are specified to others in work assignments. May assist in the training and evaluation of staff, as assigned.

Senior Engineering Technician: Receives direction. Duties are assigned with general instructions. Judgment is normally required to implement the appropriate procedures. Discretion is required in the selection of appropriate resources to use in accomplishing assigned work. Work frequently requires interpretation of policies and guidelines and regularly requires development of recommendations consistent with given directives, policies, and regulations. May exercise functional supervision in addition to technical supervision. Incumbents are responsible for recurring work tasks of activities within a given functional area or group involving other employees to whom they give direction and guidance. Incumbents are regularly assigned lead supervision on a project basis or on a set of work activities including assigning, monitoring, and reviewing the tasks and duties performed by other employees.

## **QUALIFICATIONS** (Varies depending upon assignment)

### **Knowledge of:**

#### Engineering Aide:

- Terminology, methods, practices, and techniques of manual and computer-aided drafting.
- Manual and computer-aided drafting nomenclature and symbols.
- Trigonometry as applied to the computation of angles, areas, distances, and traverses.
- Surveying techniques and practices.
- Engineering maps and records.
- Computers and computer programs.

#### Senior Engineering Aide:

In addition to the above, knowledge of:

- Municipal or utility engineering policies and procedures.
- Basic engineering techniques, principles, and practices related to area of assignment.
- Methods and materials in the design and construction of (depending upon assignment) municipal facilities including streets, sewers, storm drains; or electric/water utility facilities.
- Policies and regulations governing the construction, extension, and maintenance of (depending upon assignment) municipal facilities including streets, sewers, storm drains; or electric/water utility facilities.

- Technical report writing.
- Methods and techniques of engineering, manual and computer-aided drafting, and estimating.

Engineering Technician:

In addition to the above, knowledge of:

- Intermediate engineering principles and practices related to area of assignment.
- State and federal contract regulations.

Senior Engineering Technician:

In addition to the above, knowledge of:

- Advanced engineering principles and practices related to area of assignment.

**Ability to:**

Engineering Aide:

- Read figures quickly and accurately, use a calculator, and make arithmetical calculations including angles, areas, and distances.
- Understand and follow oral and written instructions and sketches.
- Communicate clearly and concisely, orally and in writing.
- Perform routine engineering designs, estimates, and computations.
- Perform routine engineering drafting work.
- Reduce, interpret, and apply field notes in the performance of drafting duties.
- Operate personal computers and engineering-related computer programs.
- Operate blueprint and copying machines.
- Operate manual and computer-aided drafting equipment, printers, and plotters.
- Operate surveying tools including levels, rods, grade stakes, monuments, transits, and theodolites.
- Operate other job related equipment, as required.
- Operate a City vehicle.

Senior Engineering Aide:

In addition to the above, ability to:

- Perform technical research and provide reliable advice on engineering problems or projects.
- Perform moderately complex engineering calculations with speed and accuracy.
- Prepare complete plans, estimates, and materials of assigned routine municipal or utility projects or segments of large and complex projects.
- Prepare moderately complex design calculations and engineering drawings.
- Understand and apply basic engineering principles and practices used in assigned area.

- Perform studies and write reports of routine complexity.
- Assist in supervising, training, and evaluating of lesser-skilled technical staff.

#### Engineering Technician:

In addition to the above, ability to:

- Perform complex engineering calculations with speed and accuracy.
- Prepare complete plans, estimates, and materials of assigned large, complex, municipal or utility projects.
- Prepare and check complex design calculations and engineering drawings.
- Perform studies and write reports of intermediate complexity.
- Understand and apply intermediate engineering principles and practices used in assigned area.

#### Senior Engineering Technician:

In addition to the above, ability to:

- Perform advanced, complex, engineering calculations with speed and accuracy; use discretion in interpreting results.
- Prepare and check complete plans, estimates, and materials of assigned large, complex, municipal or utility projects.
- Formulate and check complex technical drawings; use technical ability to resolve assignments that are broad in scope and involve unique and complex problems.
- Understand and apply advanced engineering principles and practices used in assigned area.
- Perform studies and write reports of advanced complexity.
- Supervise, train, and evaluate lesser-skilled technical staff.

### **Education and Experience**

#### Engineering Aide:

Any combination of experience and education that would likely provide the required knowledge and abilities is qualifying. A typical way to obtain the knowledge and abilities would be:

Education: Equivalent to completion of twelfth grade including or supplemented by courses in mathematics and in computer-aided and manual drafting.

Experience: None required.

#### Senior Engineering Aide:

Any combination of experience and education that would likely provide the required knowledge and abilities is qualifying. A typical way to obtain the knowledge and abilities would be:

Education: Equivalent to completion of twelfth grade supplemented by the equivalent of 15 semester units in engineering and mathematics from an accredited college or university.

Experience: Three years of para-professional drafting/design, office, and field engineering work. An Associate Degree may substitute for one year of the required experience. One year of additional experience may substitute for the 15 unit education requirement.

### Engineering Technician:

Any combination of experience and education that would likely provide the required knowledge and abilities is qualifying. A typical way to obtain the knowledge and abilities would be:

Education: Equivalent to completion of twelfth grade supplemented by the equivalent of 30 semester units in engineering and mathematics from an accredited college or university.

Experience: Six years of experience in the design and engineering phases of (depending upon assignment) municipal facilities including streets, sewers, storm drains; water utility facilities; or electric/water utility facilities. An Associate Degree may substitute for one year of the required experience. An additional year of experience may substitute for the 30 semester units.

### Senior Engineering Technician:

Any combination of experience and education that would likely provide the required knowledge and abilities is qualifying. A typical way to obtain the knowledge and abilities would be:

Education: Equivalent to completion of an Associate degree (60 semester units) from an accredited college or university with a major in engineering or closely related field.

Experience: Nine years of experience in the design and engineering phases of (depending upon assignment) municipal facilities including streets, sewers, storm drains; water utility facilities; or electric/water utility facilities. A Bachelor's Degree from an accredited college or university with a major in engineering or a closely related field may substitute for two years of experience. Two additional years of experience may substitute for the education requirement on a year-for-year basis.

**MEDICAL CATEGORY:** Group 1

### **NECESSARY SPECIAL REQUIREMENT**

Possession of an appropriate, valid, Class "C" Motor Vehicle Operator's License.

When assigned to Water Operations, possession of, or the ability to obtain, within six months, a valid Backflow Prevention Device Tester certificate issued by Riverside County; possession of a valid Backflow Prevention Assembly General Tester certificate issued by the American Water Works Association (AWWA); possession of a valid Cross-Connection Control Program Specialist certificate issued by AWWA; possession of a valid Grade D2 Water Distribution Operator; and T1 Water Treatment Operator certificate issued by California Department of Health Services (DHS). Ability to obtain Grade D3 Water Distribution Operator and Grade T2 Water Treatment Operator certificates within two years of employment.

### **CAREER ADVANCEMENT OPPORTUNITIES**

**FROM:** Engineering Aide

**TO:** Senior Engineering Aide

**TO:** Engineering Technician

**TO:** Senior Engineering Technician

**TO:** Supervising Engineering Technician

**JOB DUTY EXAMPLES  
GENERAL (APPLICABLE TO ALL AREAS)**

TYPICAL DUTIES MAY INCLUDE, BUT ARE NOT LIMITED TO:					
		AIDE	SENIOR AIDE	TECH	SENIOR TECH
<b>GIS/CAD/CADME, DATABASE, AND OTHER COMPUTER APPLICATIONS SUPPORT</b>					
1	Update and maintain City records.	X	XX	XX	
2	Produce custom reports and map products by using command line features and by writing simple macro level programs.	X	XX		
3	Write sophisticated programs using all needed programming features and commands including those that interact with the operating system and other applications.			X	XX
4	Train others in the use of computer applications at the level of the worker's knowledge and familiarity.	X	XX	XX	XX
5	Develop procedures and standards for use of computer applications.		X	XX	
6	Direct or support the development of computer applications by consultants and professional programmers.		X	XX	
7	Modify or enhance existing computer applications including CADME, work order tracking, cost estimating, and report formats.		X	XX	
<b>COMPUTER TECHNOLOGY SUPPORT</b>					
These duties are not the primary responsibilities of Aides and Techs but may be performed by Aides and Techs to support the technology functions within their section.					
1	Unpack and setup computers, cabling, and peripherals; check cable connections; fix paper jams; and assist in routine maintenance.	XX	XX		
2	Install local software and drivers.	X	XX		
3	Edit configuration files.	X	XX		
4	Research user needs for new and enhanced technology.		X	XX	
5	Procure equipment and software.		X	XX	
6	Troubleshoot and resolve user problems.		X	XX	
7	Represent users on technical committees.		X	XX	
8	Install and troubleshoot network drivers and configure network nodes.		X	XX	
9	Install and troubleshoot network hardware and software.		X	XX	
10	Install and troubleshoot network server and operating system.		X	XX	
11	Procure standard user equipment such as PC's, printers, and other user accessories.	X	XX		
12	Procure network equipment such as servers, disk drive arrays, network interface cards, routers, and concentrators.		X	XX	

X With Close Supervision  
XX With General Supervision

TYPICAL DUTIES MAY INCLUDE, BUT ARE NOT LIMITED TO:		AIDE	SENIOR AIDE	TECH	SENIOR TECH
13	Work with division managers and supervisors to set standards to meet division requirements. Specify, install, and troubleshoot network equipment.			X	XX
14	Represent users at a level corresponding to a worker's capability on technical committees.	X	XX	XX	XX
15	Research user needs for new and enhanced technology.		X	XX	XX
16	Develop or enhance network applications.		X	XX	

**JOB DUTY EXAMPLES  
PUBLIC WORKS ENGINEERING AIDE/TECHNICIAN SERIES**

TYPICAL DUTIES MAY INCLUDE, BUT ARE NOT LIMITED TO:		AIDE	SENIOR AIDE	TECH	SENIOR TECH
<b>STREET/HIGHWAY DESIGN</b>					
1	Perform flexible pavement design.		X	XX	
2	Perform rigid pavement design.			XX	
3	Perform pavement evaluation/ rehabilitation design.		X	XX	
4	Perform planning/environmental review.			X	XX
5	Perform cost estimating/economic analysis.	X	X	XX	
6	Perform cross section design.		X	XX	
7	Perform horizontal/grade design.		X	XX	
8	Perform coordinate geometry/traverse closures.		X	XX	
9	Perform intersection/channelization design.		X	XX	
10	Utilize construction principles/practices.		X	XX	
11	Perform railroad-highway grade separation design.			X	XX
12	Prepare easement/parcel deeds.		X	XX	
13	Draft construction drawings.	X	XX	XX	
14	Research right-of-way, easement, and utility information.	X	XX	XX	
15	Prepare standard drawings.	X	XX	XX	
<b>SEWER AND STORM DRAIN DESIGN</b>					
1	Perform open channel analysis.			X	XX
2	Perform closed conduit analysis.			X	XX
3	Perform rational method runoff analysis.			XX	
4	Perform hydrograph runoff analysis.			X	XX
5	Perform retention basin analysis/design.			X	XX

X With Close Supervision  
XX With General Supervision

TYPICAL DUTIES MAY INCLUDE, BUT ARE NOT LIMITED TO:		AIDE	SENIOR AIDE	TECH	SENIOR TECH
6	Perform storm water/wastewater pump station design.			X	XX
7	Perform wastewater flow generation computer analysis.			X	XX
8	Perform pipe thrust/anchorage.			X	XX
9	Perform gravity sewer design.		X	XX	
10	Perform storm drain design.		X	XX	
11	Draft construction drawings and details.	X	XX	XX	
12	Estimate quantities and prepare cost estimates.	X	XX	XX	
<b>STRUCTURAL ANALYSIS/DESIGN</b>					
1	Perform box culvert design.			X	XX
2	Perform slabs/foundations/footings design.			X	XX
3	Perform retaining wall design.				X
4	Perform vehicular/pedestrian bridge design.				X
5	Perform buried conduit analysis.			X	XX
6	Perform horizontal/vertical diaphragm, including seismic analysis.			X	XX
7	Perform soil mechanics shear and bearing capacity.			X	XX
8	Perform beam/column frame analysis.				X
<b>TRAFFIC ANALYSIS/DESIGN</b>					
1	Perform traffic control device analysis/design.		X	XX	
2	Perform parking design/operation.	X	X	XX	
3	Perform parking/street illumination analysis/design.	X	X	XX	
4	Perform intersection design/channelization analysis.		X	XX	
5	Perform traffic study report writing.			XX	
6	Perform traffic signal/stripping plan checking.		X	XX	
7	Perform traffic signal striping plans.	X	X	XX	
8	Perform intersection capacity analysis.			XX	
9	Perform accident analysis/court testimony.			X	XX
10	Perform level of service analysis.			X	XX
<b>CONTRACT ADMINISTRATION/INSPECTION</b>					
1	Perform construction inspection.		X	XX	
2	Perform construction contract administration.		X	XX	
3	Perform verification of payroll records.	X	XX	XX	
4	Perform field checking of as-built conditions.	X	X	XX	
5	Prepare/check construction grade sheets.	X	X	XX	
6	Evaluate construction bids.	X	X	XX	XX

X With Close Supervision  
XX With General Supervision



TYPICAL DUTIES MAY INCLUDE, BUT ARE NOT LIMITED TO:		AIDE	SENIOR AIDE	TECH	SENIOR TECH
<b>SURVEY</b>					
1	Operate complex survey instruments including electronic total station and transits with speed and accuracy.	X	XX	XX	
2	Operate basic survey instruments including automatic level; place level rod and sight for measuring elevations and angles.	XX	XX	XX	
3	Perform complex mathematical surveying computations for the determination of boundaries and construction layout.		X	XX	
4	Make moderately complex mathematical surveying computations; review computations performed by Survey Party Chief.	X	XX	XX	
5	Make basic mathematical calculations related to surveying.	XX	XX	XX	
6	Set and mark monuments and stakes; recover buried monuments.	X	XX	XX	
7	Assist in measuring accurate distances to be used to determine the locations of boundaries, easements, improvements, structures, and topographic features.	X	XX	XX	
8	Determine layout of necessary traffic control safety devices.		X	XX	
9	Assist in layout of necessary traffic control safety devices.	X	XX	XX	
10	Act as Party Chief on occasion during Party Chief's absence.		X	XX	
11	Read and interpret basic construction plans.	X	XX	XX	
12	Read and interpret complex construction plans; determine method and procedure for layout of construction stakes.			X	XX
13	Review and interpret survey requests; converse with requesting Engineer/Inspector to clarify problems.		X	XX	
14	Review survey notes for accuracy and completeness.		X	XX	

**JOB DUTY EXAMPLES  
ELECTRIC ENGINEERING AIDE/TECHNICIAN SERIES**

TYPICAL DUTIES MAY INCLUDE, BUT ARE NOT LIMITED TO:		AIDE	SENIOR AIDE	TECH	SENIOR TECH
<b>ELECTRIC TRANSMISSION AND DISTRIBUTION DESIGN</b>					
1	Calculate and notify customers of required fees and charges (bonds, streetlight fees).	XX	XX	XX	XX
2	Monitor payment and status of customer projects (permits, clearances, work progress).	XX			
3	Spot single-phase residential meters to meet standard utility required clearances.	XX			
4	Spot commercial meters and switchgear based on standard utility requirements.	X	XX		
5	Understand and interpret customer information to determine general requirements and needs for single-family residential and small commercial services. Typical activities include reviewing and approving customer's plans and forms, building permits, right of way cases, and	X	XX		

X With Close Supervision  
XX With General Supervision

TYPICAL DUTIES MAY INCLUDE, BUT ARE NOT LIMITED TO:		AIDE	SENIOR AIDE	TECH	SENIOR TECH
	over the counter permits.				
6	Use standard charts and tables for loading, voltage drop, and flicker to size, layout, and estimate single and simple three phase services; select secondary source for single phase loads; check loading on single phase transformers; size and estimate single phase transformers.	X	XX		
7	Estimate labor, work order, and project costs, using standard construction assemblies and materials.	X	XX		
8	Apply standard guidelines and software to design decisions and options by following established procedures.	X	XX		
9	Layout and design residential tracts (larger than 15 lots) including street lighting, single-phase primary and all transformers and services.		X	XX	
10	Understand and interpret customer information to determine general requirements and needs for medium to large commercial services. Typical activities include reviewing and approving customer's plans and forms, building permits, right of way cases, and over the counter permits.		X	XX	
11	Layout and design complex three phase services for projects of intermediate scope and size including transformers, service conductors, and associated structures using engineering formulas and practices; prepare estimates.		X	XX	
12	Check others work for conformance with well-established guidelines and standards. Develop and modify new guidelines and come up with non-standard solutions as needed.		X	XX	
13	Design and administer large electrical projects such as shopping centers, large industrial customers, major new feeders, large subdivisions, and major street improvement projects.			X	XX
14	Design custom street lighting systems and arterial street lighting systems and develop guidelines for standard layouts.		X	XX	

#### CONTRACT AND PROJECT ADMINISTRATION

1	Copy drawings and specifications; assemble bid packets; make database entries from bills of material using standard entry format.	XX			
2	Track payroll and other job records; handle administrative paperwork.		X	XX	
3	Evaluate bids and recommend award for Board or Council approval.		X	XX	XX
4	Prepare requisitions from bills of material and database reports; expedite material purchase orders.	X	XX		
5	Verify completed construction units and other contractor work; generate and update information on database reports.	X	XX		
6	Develop cost estimates for change orders.	X	XX	XX	XX
7	Revise existing equipment and construction specifications; develop new equipment and construction specifications. Higher levels do more complex specifications.		X	XX	XX
8	Develop design and construction project schedules.	X	XX	XX	XX
9	Coordinate with in house designers, consultants, and outside agencies.	X	XX	XX	XX

X With Close Supervision  
XX With General Supervision

TYPICAL DUTIES MAY INCLUDE, BUT ARE NOT LIMITED TO:		AIDE	SENIOR AIDE	TECH	SENIOR TECH
10	Prepare and coordinate contracts with the City's Legal department.		X	XX	XX
11	Prepare transmittals and standard form correspondence including routine Board and Council Agenda items; prepare request for payment documents ("XX" indicates authority to recommend or approve payment, depending on scope of project).	X	XX	XX	XX
12	Develop new approaches to project implementation to reduce costs and increase efficiencies. Workers at all levels are expected to look for and to make improvements in the way they carry out their work assignments.	X	XX	XX	XX

#### INSPECTION

1	Verify proper construction practices, physical clearances, and work progress.	X	XX	XX	XX
2	Field check completed work for conformance with design drawings and specifications; annotate drawings to show as built conditions.	X	XX	XX	XX
3	Field locate underground electrical facilities.	X	XX		
4	Verify proper mandrelling of conduits; check for proper depth and bedding material.	X	XX		
5	Approve switchgear plans and inspect installed commercial switchgear.		X	XX	
6	Check material and equipment deliveries against purchase orders and lading bills.	X	XX		
7	Coordinate resolution of equipment field problems with vendors.		X	XX	
8	Field check and trace substation control wiring and mark up as-built drawings.	X	XX		
9	Meet with field crews to identify and correct construction problems.	X	XX	XX	XX
10	Field check drawings marked up as built by field crews.	X	XX		
11	Coordinate as-built revisions with field crews.	X	XX		
12	Workers develop improved approaches to field inspections, shipment checkouts, work inspection, and engineering support to field crews.	X	XX	XX	XX

#### POWER QUALITY

1	Record customer complaint and send request to set monitoring equipment at the customer's premises; download data from monitoring equipment; plot the data; prepare circuit and inventory maps of problem locations; track the progress and status of complaint.	X	XX		
2	Field check conditions at customer site. Perform EMF field measurements. Using standard conditions field check and identify sources of TV and radio interference.	X	XX		
3	Communicate with customers to gain an understanding of the problem ; record all symptoms and relevant facts about the problem.	X	XX		

X With Close Supervision  
XX With General Supervision

TYPICAL DUTIES MAY INCLUDE, BUT ARE NOT LIMITED TO:		AIDE	SENIOR AIDE	TECH	SENIOR TECH
4	Analyze voltage charts and other data to make a preliminary determination of the category of problem (primary, secondary, or customer equipment). Identify and specify corrective action for secondary and transformer caused flicker and low voltage problems.	X	XX		
5	Work with customers to identify and explain problems associated with residential customer's equipment involving low voltage and flicker problems.	X	XX		
6	Work with customers to identify and explain problems associated with grounding, stray voltage, harmonic, and three phase customer equipment. Also resolve television and radio interference problems.		X	XX	
7	Conduct in depth analysis to pinpoint and find solutions for difficult problems involving grounding and harmonic problems. Identify corrective action when needed on secondary and primary circuits.		X	XX	
8	Analyze feeder models to identify expected voltage drop and flicker characteristics and voltage impulses. Determine corrective actions if needed including circuit switching, feeder upgrades, or changing settings on substation transformer NL tap, regulators, and capacitor banks.			X	XX
9	Conduct and analyze system power flow studies to determine optimum transmission operating parameters for good voltage regulation, power factor control, and loss optimization.			X	XX
10	Issue request for distribution transformer tap change, if required.	X	XX		
11	Issue request for substation LTC settings change, or capacitor settings change, if required.	X	XX		
12	Research and procure test equipment as needed to better identify problems and solutions.		X	XX	
<b>STANDARDS AND SPECIALIZED TECHNICAL SUPPORT</b>					
1	Perform engineering studies including researching and preparing reports for economic analysis, environmental assessment, and technical justification for system improvements; prepare presentation and recommendation of alternatives to management, Boards, and Council. Develop new design and construction guidelines, write specifications, and create or revise new standards.		XX	XX	XX
<b>SUBSTATION DESIGN</b>					
1	Revise, add, modify, and create single line drawings from marked up prints.	X	XX		
2	Revise, add, modify, and create single line drawings from equipment drawings.		X	XX	
3	Revise, add, modify, and create single line drawings from engineer's concept.			X	XX

X With Close Supervision  
XX With General Supervision

TYPICAL DUTIES MAY INCLUDE, BUT ARE NOT LIMITED TO:		AIDE	SENIOR AIDE	TECH	SENIOR TECH
4	Revise, add, modify, create, and review three line drawings from marked up prints.	X	XX		
5	Revise, add, modify, create, and review three line drawings from equipment drawings.		X	XX	
6	Revise, add, modify, create, and review three line drawings from engineer's concept.			X	XX
7	Revise, modify, add, create, and review station layout drawings and standards from marked up prints.	X	XX		
8	Revise, modify, add, create, and review station layout drawings and standards from equipment drawings.		X	XX	
9	Revise, modify, add, create, and review station layout drawings and standards from single line drawings, or from engineer's concept.			X	XX
10	Revise, modify, add, create, review, and standardize control schematics from marked up prints.	X	XX		
11	Revise, modify, add, create, review, and standardize control schematics from equipment drawings.		X	XX	
12	Revise, modify, add, create, review, and standardize control schematics from single line drawings, three line drawings, and from engineer's concept.			X	XX
13	Revise, modify, add, create, review, and standardize wiring diagrams from marked up prints or standard equipment drawings.	X	XX		
14	Revise, modify, add, create, review, and standardize wiring diagrams from non-standard equipment drawings.		X	XX	
15	Revise, modify, add, create, review, and standardize wiring diagrams from single line and three line drawings, and from engineer's concept.			X	XX
16	Revise, modify, add, create, review, and standardize equipment elevations and section drawings from marked up prints.	X	XX		
17	Revise, modify, add, create, review, and standardize equipment elevations and section drawings from equipment drawings.		X	XX	
18	Revise, modify, add, create, review, and standardize equipment elevations and section drawings from single line drawings, and from engineer's concept.			X	XX
19	Revise, modify, add, calculate, create, review, select, and standardize bill of materials and data base entries; establish stock materials from marked up prints, equipment drawings needs assessment, and purchases orders.	X	X	XX	XX
20	Revise, modify, add, create, review, and standardize foundation and structure details from marked up prints.	X	XX		
21	Revise, modify, add, create, review, and standardize foundation and structure details from equipment drawings.		X	XX	
22	Revise, modify, add, create, review, and standardize foundation and structure details from calculations and from engineer's draft, notes, and concepts.			X	XX

X With Close Supervision  
XX With General Supervision

TYPICAL DUTIES MAY INCLUDE, BUT ARE NOT LIMITED TO:		AIDE	SENIOR AIDE	TECH	SENIOR TECH
23	Revise, modify, add, create, review, trouble shoot, correct, and standardize the data base program entries, reports, and forms from bills of materials and purchase orders and create work order and budgetary cost estimates.	X	XX		
24	On projects or responsibility, prepare, check, and expedite requisitions for bills of materials and data base reports; check received material against bill of lading and purchase order; track and coordinate material using data base program for requisitions and purchase orders; evaluate bids and recommend award to Boards or City Council.	X	XX	XX	XX
25	Revise, modify, review, verify, markup, design, and document revisions by field and identify related drawings; coordinate revisions with field forces.	X	XX	XX	XX
26	Coordinate receipt of material, pre-construction meetings, drawing issues, design, and construction with field forces and outside consultants; identify and correct construction problems; develop project schedules for design, material, and construction with field forces.	X	XX	XX	XX
27	Revise, modify, add, create, and administer existing and new equipment and construction specifications.	X	X	XX	XX
28	Prepare and develop cost estimates for the Capital Improvement Plan.		X	XX	XX
29	Prepare basic, limited, and complex engineering studies, technical reports, environmental assessment and impact studies including economic analysis, recommendation of alternatives, and presentations to management.			X	XX

#### SYSTEM PLANNING

1	Collect load data relative to electric load changes.	X	XX		
2	Estimate electric load increases based on home-building size, motor size, and nature of load. Normalize historical load data for temperature and load transfers.		X	XX	
3	Compile 7-year Substation and Planning Report based on the recommendations for new feeder/transformers.			X	XX
4	Compile 7-year forecast. Evaluation need for feeders and power transformer increases. Perform economic evaluation of alternatives using present-worth analysis. Recommend optimum plan.				X
5	Collect data on available spare underground structures and overhead pole space for proposed feeder routes.	X	XX		
6	Arrange for or conduct computer load-voltage modeling of proposed feeder routes. Prepare cost estimates of options.		X	XX	XX
7	Evaluate feeder route options. Consider cost, future load growth, reliability, and operability. Recommend optimum route in report form.			X	XX
8	Analyze the impact of feeder and transformer outages. Recommend switching plans and construction of feeder ties, as necessary.			X	XX
9	Collect data on available spare feeder capacity in order to serve new electric loads. Research previous plans for serving new load.	X	XX		
	Estimate magnitude of new electric loads. Arrange for or conduct				

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TYPICAL DUTIES MAY INCLUDE, BUT ARE NOT LIMITED TO:		AIDE	SENIOR AIDE	TECH	SENIOR TECH
10	computer load/voltage modeling of major new electric loads by considering various service options. Recommend circuit reconductoring, as necessary. Prepare cost estimates of various options.			X	XX
11	Evaluate various new service options. Consider cost, future load growth, and operability.			X	XX
12	Collect 4-12 kV conversion cost data and load data in conversion area.	X	XX		
13	Estimate magnitude of electric load in conversion area. Arrange for or conduct computer load/voltage modeling of conversion area. Recommend circuit reconductoring, as necessary. Prepare cost estimates of conversion work.		X	XX	XX
14	Evaluate service options to conversion area. Consider cost, future load growth, reliability and operability. Recommend conversion plan in report form.			X	XX
15	Update transmission plan based on analysis of revised model.		X	XX	XX
16	Review transmission plan to determine reasonable options; analyze options using load flow computer program and summarize results; assist in economic comparison of alternatives using spreadsheet and assist in preparation of final report.			X	XX
17	Assist in substation location studies by computing load moments and optimum load centers, preparing drawings, graphs, tables, cost estimates, and spreadsheet analysis.		X	XX	XX
18	Assist in updating Capital Improvement Program (CIP) estimates, spreadsheets and summaries; collect, organize, and file estimates and ensure accuracy of reports; prepare graphic presentation materials for management, Board and/or Council, including overheads and slides.		X	XX	XX
19	Maintain project work schedules for electric engineering and field forces to assist in coordinated project implementation and to provide management with project information.		X	XX	XX
20	Revise input data to project critically ranking system and polish updated report, as necessary.		X	XX	XX

#### DISTRIBUTION FEEDER ANALYSIS

1	Develop and configure the Distribution Primary Analysis software and database.			X	XX
2	Maintain the Distribution Primary Analysis software and database structure.		X	XX	
3	Update the database feeder status file, index file, and update files.	X	XX		
4	Develop and utilize the database feeder status file, index file, and update files for use in scheduling, prioritizing, and tracking feeder changes.		X	XX	
5	Perform feeder analysis and prepare baseline criteria and research in support of planning and feasibility studies.		X	XX	
6	Prepare planning and feasibility studies.			X	XX

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TYPICAL DUTIES MAY INCLUDE, BUT ARE NOT LIMITED TO:		AIDE	SENIOR AIDE	TECH	SENIOR TECH
7	Prepare and recommend specific parts of the annual budget.			X	XX
8	Develop presentation graphics/aides such as maps, charts, spreadsheets, slides, and related items; conduct presentations as required for engineering projects.		X	XX	
9	Perform feeder power quality and performance analysis to determine feeder deficiencies relating to voltage, power factor, loading, and loss evaluation; recommend the proper course of action to mitigate problems and to improve feeder performance.			X	XX
10	Research, collect, and develop data for developing distribution equipment and contract specifications.		X	XX	
11	Prepare electrical distribution equipment and contract specifications for major equipment or large projects.			X	XX
12	Perform power factor, capacitor, and regulator application studies to evaluate the need for application of capacitors and regulators and subsequently determine the optimum quantity and location of such equipment.			X	XX

**JOB DUTY EXAMPLES  
WATER ENGINEERING AIDE/TECHNICIAN SERIES**

TYPICAL DUTIES MAY INCLUDE, BUT ARE NOT LIMITED TO:		AIDE	SENIOR AIDE	TECH	SENIOR TECH
<b>GENERAL (Applicable to all Sub Categories)</b>					
1	Prepare purchase requisitions.		X	XX	
2	Provide customer assistance.	X	X		
3	Schedule work.			X	XX
4	Assist in preparing board & council memos.		X	XX	
5	Participate in utility coordination efforts.		X	XX	
6	Prepare feasibility reports & cost effective analysis.		X	XX	
7	Assist in budget preparation.			X	XX
8	Assist in monitoring project cost.			X	XX
9	Maintain data base(s) for water projects.	X	XX		
10	Operate copying machines & printers.	X	XX		
11	Prepare table/charts using spreadsheet, word processing, & data base programs.	X	XX		
12	Prepare maps & exhibits using AutoCad or other graphic programs.	X	XX		
13	Collect, retrieve, & organize data.	X	XX		
14	Organize & maintain documents.	X	XX		
15	Perform calculations & analysis.	X	X	XX	
16	Assist in contract administration.		X	XX	XX
<b>DESIGN, PLAN CHECKING &amp; CONTRACT ADMINISTRATION</b>					
1	Research right-of-way, existing utilities, and easement information.	X	XX	XX	
2	Calculate pipeline alignment.		X	XX	
3	Calculate pipeline stationing.		X	XX	

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TYPICAL DUTIES MAY INCLUDE, BUT ARE NOT LIMITED TO:		AIDE	SENIOR AIDE	TECH	SENIOR TECH
4	Calculate pipe wall thickness.		X	XX	
5	Calculate thrust block areas.		X	XX	
6	Prepare material take-off.		X	XX	
7	Order pipe material.		X	XX	
8	Prepare engineer's cost estimate.		X	XX	
9	Assist in preparing construction specifications.			X	XX
10	Prepare construction plans.	X	XX	XX	
11	Plot rights-of-way, property lines, and existing utilities.	X	XX		
12	Plot existing improvements.	X	XX		
13	Lay out pipe alignment stations.		X	XX	
14	Locate & size water main appurtenances.		X	XX	
15	Prepare connection details.		X	XX	
16	Prepare thrust block details.		X	XX	
17	Design well & booster station components.			X	XX
18	Perform structural analysis of pipe.			X	XX
19	Perform basic pipeline hydraulics.			X	XX
20	Perform field surveys.		X	XX	
21	Assist in construction inspection.		X	XX	
22	Perform shop drawings review.		X	XX	
23	Interpret survey notes.	X	XX		
24	Interpret storm drain & sanitary sewer plans.	X	XX		
25	Perform grading and estimate earthwork quantities.		X	XX	
26	Perform right-of-way analysis.		X	XX	
27	Assist in preparation of traffic detour plans.			X	XX
28	Prepare pothole requests.	X	XX		
29	Assist in performing value engineering.			X	XX
30	Assist in performing constructability review.			X	XX
31	Evaluate construction bids.			X	XX
32	Prepare standard details.	X	X	XX	
33	Prepare "as-built" drawings.	X	XX		
34	Check plans prepared by outside consultants.			X	XX
35	Maintain work order records.	X	XX		
36	Maintain water main leak records.	X	XX		
37	Prepare construction grade sheets.		X	XX	
38	Check construction grade sheets.	X	XX		
39	Coordinate with developers, consultants, and engineers on design, standards, etc.			X	XX
40	Assist in performance evaluations.			X	X

#### WATER PLANNING

1	Assist in permit process.		X	XX	
2	Perform fire flow tests.	X	XX		
3	Coordinate water fees, charges & requirements with developers.			X	XX
4	Prepare environmental studies.	X	X	XX	

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TYPICAL DUTIES MAY INCLUDE, BUT ARE NOT LIMITED TO:		AIDE	SENIOR AIDE	TECH	SENIOR TECH
5	Prepare planning studies.	X	X	XX	
6	Verify legal descriptions.		X	XX	
7	Assist in water rules updates.		X	XX	
8	Coordinate real property acquisition/sale.			X	XX

#### WATER RESOURCES

1	Review water quality test results, collected by City's Operation Division, other local agencies, and Federal Agencies (Air Force, EPA, USGS, etc.).			X	XX
2	Review water quality trends in wells for various contaminants of concern.			X	XX
3	Investigate sources of water quality problems.			X	XX
4	Develop and update water records data base; water levels, pumping rates, well logs etc.	X	XX		
5	Maintain water quality database and correct any lab/input errors.		X	XX	
6	Produce groundwater level reports and review/evaluate water level trends in wells.	X	X	XX	
7	Analyze water quality and level trends to discover dynamics of the groundwater basins and to project future contaminant levels.				X
8	Develop plan of actions to meet water quality standards.			X	X
9	Develop plan of actions to minimize water quality problems.			X	XX
10	Review and comment on proposed State and EPA Water Quality/Safe Drinking Act legislation.				X
11	Review and comment on proposed State and EPA Water Quality/Safe Drinking Act legislation.			X	XX
12	Draft letters to legislators for City administration regarding Water Quality/Safe Drinking Water Act issues.			X	XX
13	Prepare reports and provide technical/professional support to Water Operation Division regarding Water Quality issues and State requirements.				X
14	Evaluate and comment on groundwater basin studies and planning.				X
15	Evaluate and comment on the land use activities regarding impacts on groundwater and water quality.			X	XX
16	Assist water resources engineers in preparation of water supply reports, water quality evaluations, and water supply and water quality planning.		X	X	XX
17	Provide water quality, water levels, and other water resource related data, information for research and studies to ACWA, AWWA, local agencies, etc.		X	XX	
18	Use CADME/ARCINFO for analyses and to produce custom maps.		X	XX	
19	Maintain data base(s) for water resources projects.	X	X	XX	
20	Assist in performing technical research.			X	XX

#### WATER OPERATIONS

1	Upgrade maps & records.	X	XX		
2	Perform pump efficiency tests.	X	XX		
3	Perform water quality tests.	X	X	XX	
4	Perform backflow inspection.			X	XX
5	Manage backflow program.			X	XX

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TYPICAL DUTIES MAY INCLUDE, BUT ARE NOT LIMITED TO:		AIDE	SENIOR AIDE	TECH	SENIOR TECH
6	Manage water quality program.			X	XX
7	Perform backflow tests.		X	XX	
8	Review and update water quality legislation.			X	XX
9	Produce water records.	X	XX		
10	Assist in water quality research.		X	XX	
11	Assist in ground water basin research.		X	XX	
12	Produce ground water level reports.	X	X	XX	
13	Dispatch SCADA alarms.	XX			
14	Operate radio system.	XX			
15	Coordinate fire service turn-ons.	X	X	XX	
16	Perform inventory control.	XX			
17	Prepare annual water quality report.		X	XX	
18	Assist in water quality report.	X	X	XX	
19	Review building plans.		X	XX	
20	Assist in customer complaint.	XX			
21	Evaluate EPA and state regulations.		X	XX	
22	Perform school education programs.	X	XX		

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